

Jessica Blosberg
Academy for Sciences and Agriculture
Vadnais Heights, MN
Kuwait, Factor 2

Making the Desert Bloom

A flat desert plain, known as Kuwait, stretches across 17,820 square kilometers (6,880 square miles) between Iraq and Saudi Arabia. There is very little freshwater above or below the surface of the earth in this region. Intensely hot summers reach average temperatures between 42°C and 49°C (108°F-120°F) (U.S. Department of State). The short winters only last from December to February and bring average temperatures of 10°C-30°C (50°F-80°F). Winter is also Kuwait's rainy season, with an average rainfall of 10 centimeters (4 inches) per year (Willis, pg 19). Although there is little rain, the heaviest rainfalls often still damage roads and houses. In the months when rain is scarce, wind whips dry sand across the desert and creates sandstorms, common occurrences in Kuwait between March and August (Gomideast). Not many Kuwaitis live far from the coast of the Persian Gulf because of water scarcity. Because there is so little water anywhere else in the country, 95% of the freshwater that is used in Kuwait comes from the Persian Gulf (Willis, pg 17). Desalination plants are the only way to transform the saltwater from the gulf to freshwater that is suitable for consumption by humans and animals. "Huge desalination plants take water from the Persian Gulf, remove the salts and other impurities, and produce nearly all of the country's freshwater supply. The country has six desalination plants. The oldest was built in 1953. All the plants combined produce approximately 251 million gallons (950,000 cubic meters) of water per day. The country also treats and recovers its wastewater. About 80 to 90 percent of all wastewater – nearly 30 billion gallons (113 million cubic meters) - is treated and reused for irrigation of crops and landscaping" (Isiorho, pg 80).

In addition to a shortage of freshwater within the borders of the country, Kuwait also has very little fertile soil in which to grow crops. "Less than 1 percent of the country can be used as farmland to grow food" (Willis, pg 15). This means that a majority of the food consumed in Kuwait must be imported from other countries. Fortunately, the Kuwaiti government is very wealthy and can currently afford the imports. The country sits on multiple underground areas that are predicted to be filled with approximately 99 billion barrels-worth of oil collectively (Willis, pg 69). The "income from the export of oil is paid directly to the government" (O'Shea and Spilling, pg 41). As a result of the money going to the Kuwaiti government instead of the people, the government is able to offer free services to the citizens.

The Kuwaiti government has tried to be careful about how to handle its new wealth since the discovery of oil in the country. The current emir (head ruler) is Sabah Al-Ahmed Al-Jaber Al Sabah. Since the beginning of his reign, January 1978 (Embassy), money from the oil exports has been used to fund desalination plants along the Persian Gulf coast, provide free education and health care to all Kuwaitis, construct new roads for travel throughout the country, and build new ports for shipping the exported oil. Another way Kuwait has been able to maintain its wealth is by importing certain goods. "Food, automobiles, appliances, computers, and other electronic devices, as well as all manner of items for the household, must be obtained from foreign manufacturers" (Marcovitz, pg 61). Most products are imported because there are few factories in Kuwait for making "everyday" items. "[...] Kuwaitis will not work for less money than they can receive from the government simply by being citizens. Producing things in Kuwait would be expensive, as the wages for Kuwaitis would be too high" (O'Shea, pg 42). Current Kuwaiti companies mainly employ foreign workers or residents who are not full Kuwaiti citizens. "Not everyone born in Kuwait, or who has lived in Kuwait for centuries, is a citizen of the country. The Bedoons, which in Arabic means 'without,' are people who have no papers (documents) to prove their nationality; hence, they have no rights to citizenship [...] Recently, Kuwait's ruler has made it possible for some Bedoons to become citizens of the country" (Isiorho pg 54). By hiring foreigners who are desperate for jobs, companies have to pay comparatively lower wages. Unfortunately, these employees

also have inferior living conditions than people who are Kuwaiti citizens. Kuwaiti citizens live very privileged lives. Thanks to their government being wealthy enough to take care of its people, Kuwaitis rarely need to worry about whether or not their country will run out of food and water, or if they will be able to receive free health care and education.

Although Kuwait is very prosperous today, this wealth will be short-lived after the underground supply of oil is gone. This supply is expected to “last for more than 100 years” (O’Shea and Spilling, pg 41) but cannot be Kuwait’s primary source of income forever. Agriculture is, and always will be the future for any nation. Unfortunately, only 1% of the land in Kuwait is suitable for agricultural use (Willis, pg 17). Naturally, there are very few Kuwaiti farmers. Most of the farms in Kuwait are in the southern area of the country known as Wafra. “Some milk is produced in Kuwait, and some farmers raise chickens, sheep, and goats” (Willis, pg 73). Other common crops include tomatoes, onions, melons, dates, cucumbers, and eggplants. These crops are often produced on farms that are run by families rather than companies.

Rural Kuwaiti families are not very different from the families that live in the cities. The traditional nomadic lifestyles of the Kuwaiti people led to a mindset that “plump children are healthy” (Countries and Their Cultures). This idea has been more accepted since the rise in the Kuwaiti oil industry. Diets and daily exercise amounts have changed considerably as modern western traditions have become more popular in Kuwait. According to “Countries and Their Cultures”, Kuwaitis do not get as much physical activity as previous generations. This decrease is most likely due to the increased amount of imported food and rise in the number of people who drive cars in Kuwait, rather than walk. With some of the money from the oil industry, the Kuwaiti government has been able to build new roads around the country. Easier transportation has also been extended to cargo ships that come into the country with imported goods from around the world. As a result of importing more food, modern Kuwaitis spend very little time working outside when compared to their traditional ancestors. If Kuwaitis began growing more of their own food, they would become more physically active, healthier, and would buy less imported food. By importing less food, more money would stay within the country of Kuwait and benefit its citizens by allowing them to buy other necessary goods.

Although Kuwait currently imports most of its food, the peoples’ “habits of nutrition have not completely changed to accommodate the present environment” (Countries and Their Cultures). It is still normal for families to sit together and eat three large meals each day. Breakfast commonly consists of meat, such as fried liver or kidneys, which is usually served with a dairy product, such as cheese or yogurt. Lunch and dinner usually each have one of several choices of meat dishes. These dining traditions come from the nomadic origins of Kuwaiti culture. Meat was part of the desert nomad’s diet, and still is for the remaining nomads that roam the deserts of the Middle East. Plants have not been a large part of the nomadic diet in the last few hundred years due to desertification and lack of water in the country.

Thousands of years ago, when humans started farming their food instead of hunting or gathering their provisions, the Middle East was one of the most fertile areas on the planet (Diamond). It is said to be the area of the world where farming first originated. The area that is known today as the “Middle East” used to be the “fertile crescent” (Diamond). However, farming practices included planting crop after crop in the same area and never allowing the land time to renew itself and become fertile again. After thousands of years of being “over farmed,” the area that is now known as the “Middle East” was turned from fertile land to desert through desertification. Desertification is the name of the process when fertile land turns to desert because an area is farmed too much, or too little water is available for plants to be able to survive (GreenFacts). Sadly, farming has not “been a successful pursuit because of the harsh climate” (O’Shea and Spilling, pg 48) in recent centuries. Desertification, along with severe water scarcity in Kuwait has helped lead to the reality that most of the country’s consumable items are imported. The country cannot currently supply enough produce for its own people because there is not enough fertile soil. “Kuwait’s inadequate water supply is a major limiting factor for agriculture” (Isiorho, pg 80). “In some places, salt is

accumulating in the soil at a fast rate, making it unfit for crops. In other areas, particularly those where soil has a high clay content, water has started to collect in a process called water logging. In both cases, soil becomes ruined and unable to produce crops” (Isiorho, pg 81).

“Kuwait has an estimated 101.5 billion barrels of oil left [as of 2010], which at the current rates of extraction will last for more than 100 years” (O’Shea and Spilling). While there may not be enough water for growing crops, water scarcity does not yet negatively affect Kuwaitis because the government has enough income to invest in desalination plants, food, and water. The people are also still getting most of their food from other countries. Kuwaitis grow a few fruits and vegetables, but not an adequate amount to support the needs of the whole country. Although Kuwait is helping to financially support other countries by importing their own items, this could become a danger for Kuwait if the government runs out of money. The Kuwaiti culture needs to change in ways that will renew life to the desert so there is more fertile soil and area to grow crops. If more sustainable and alternative agricultural practices are not put into use in the next few years, the people will not be knowledgeable enough about sustainable practices by the time their country hits a true water crisis. It is predicted that this disaster will occur shortly after the underground oil supply runs out in Kuwait.

One way to combat the issue of water scarcity and small amount of farming in Kuwait could be using hydroponic systems. Hydroponic systems use water, a pump, and a container for holding the plants. “Liquid hydroponic systems have no other supporting medium of the plant roots [...]” (Jensen). There are two main groups of hydroponic systems. “Hydroponic systems are [...] categorized as open (i.e., once the nutrient solution is delivered to the plant roots, it is not reused) or closed (i.e., surplus solution is recovered, replenished, and recycled). [...]” (Jensen). Hydroponic systems are [...] also highly productive, conservative of water and land, and protective of the environment. Yet for most of its employees, hydroponic culture requires only “basic agriculture skills” (Jensen). These “basic agriculture skills” include harvesting the crops, and adding water and nutrients to the system. Hydroponic systems work by drawing water up from a lower tray and letting the water drip past the plants’ roots. The ends of the roots are sitting in water, so the plants have a constant supply of liquid and nutrients. If extra nutrients are added to the water, the plants will most likely produce a higher yield and overall, be healthier, longer-living plants (Thayer).

If people set up a hydroponic system in their own home, or community, food could be produced locally instead of being imported from other countries around the globe. Hydroponic systems require only water to grow the plants. Soil is usually only used to help establish juvenile plants (HowStuffWorks). These systems can also grow plants faster than traditional gardening methods because the nutrients go directly from the water to the plant. Nutrients cannot become trapped in soil and reduce the amount of nutrients that can reach the plant (Burson). Hydroponics would help lessen the water scarcity in Kuwait because the hydroponically-grown plants require less water than traditional gardening. Lettuce is one of the more popular of hydroponically grown vegetables. It is easy to take care of, needing only an hour or less of care each day. The care for this crop mainly includes adding water to the hydroponic system and checking the nutrient levels. This plant, after six weeks, can produce enough lettuce to be harvested every two days.

One of the benefits to Kuwaitis growing lettuce hydroponically and for their own consumption is that the growing process requires no soil at all (Burson). Less water used for plants means that more water can be used in other places around the country, or less water would need to go through the desalination plants each day. By reducing the amount of water being desalinated for farming, the government could save money.

Many kinds of plants can be grown hydroponically. Tomatoes, sweet peppers, cucumbers, squash, peas, beans, lettuce, and broccoli are among the most popular, but nearly any vegetable can flourish in a hydroponic system. Tomatoes and cucumbers are already common crops in Kuwait, which would make the transition to hydroponic gardening simpler, because the people already know how to grow them. The

two most significant benefits of growing produce hydroponically could be decreased amounts of water being used to grow plants, and increased production when compared to traditional farming methods.

While farming methods in Kuwait do not meet the needs of the people by providing enough food, there are still very few people in Kuwait who are considered malnourished or undernourished. Surprisingly, according to “Maps of the World” and the “United Nations Development Programme” very few Kuwaitis, if any, live in poverty. “Poverty” is defined by the Business Dictionary as the “standard family income threshold (set by each state and revised occasionally) below which the family is officially classified as poor [...]” As a result of none of the citizens being considered “poor,” the residents of Kuwait usually have plenty to eat, and, thanks to the government’s funding of desalination plants, Kuwaitis also have a seemingly limitless supply of freshwater. Water scarcity in Kuwait will most likely become a more pressing matter when the government cannot afford to fund the desalination plants. These financial difficulties will most likely start soon after the oil runs out (O’Shea and Spilling). A gradual rise in population will also lead to an increase in the demand for more water and food to support the basic needs of the people. Kuwait’s financial problems will start to affect other countries too if Kuwait cannot afford to import its current amount of items. These countries gain money from Kuwait. If that money is no longer being provided, the other countries may also start to have financial complications. Kuwait can start now to avoid these issues by researching new methods of cultivating their own crops. Hydroponic systems are one alternative that has already been researched a little in Kuwait.

Growing plants hydroponically is not an act that is limited to farmers. Hydroponic systems can be used in areas as small as four square feet (Burson). If each family in Kuwait chose to grow a small hydroponic garden in its home, it could supply itself with fresh vegetables nearly every day. Even though most of the population of Kuwait lives in a city or within a few kilometers of the Persian Gulf coast, this would still be possible because hydroponic systems take up very little space and can be used indoors, as long as they are near a window with plenty of sunlight.

Growing plants in hydroponic systems in a greenhouse would also save water. When plants are watered, some of the water evaporates and goes into the air. Some people think the water in the air is being “wasted” because it is not being used for the plants. To lower the amount of water being evaporated into the air and not returning the plants, the evaporated water could be collected. By growing plants in a green house, this “extra water” would collect on the roof. If the roof is slanted at a steep enough slope and towards one specific point, the condensed water could be collected and reused on the plants. This method of water collection could also work for hydroponically grown plants because they are constantly in water. Even though hydroponically-grown produce already uses approximately half as much water as traditionally-grown produce, collecting and reusing the water would still save on the amount that is actually used (Burson).

Kuwait has been struggling with water scarcity and little room for farms for decades. The people have come up with many ways to combat these issues as technology and farming practices have become more advanced. Hydroponics and irrigation systems are two examples of alternative farming practices. If Kuwaiti farmers adopt new methods of farming, such as hydroponics, they will be able to produce more food than possible with traditional farming techniques. By selling food to the same community in which it is grown, money will stay in the local area and Kuwait, rather than going to other countries to pay for imported food. Hydroponics would be a better farming practice in Kuwait, as opposed to traditional “in-ground” farming because there is very little fertile soil in Kuwait that is available for farming. Hydroponics would also be useful in Kuwait because water that has been purified by desalination plants is plentiful. Using alternative farming practices to grow food could lead to domestic economic development because there would be less of a need to import food. Irrigation systems are part of another option that is alternative to traditional farming methods. Irrigation systems are used on some farms in an attempt to reduce water usage and save money. Some Kuwaitis have already begun finding solutions to the water scarcity issue in their country. For example, one Kuwaiti high school student found a new way to improve

the irrigation system on his farm in Al Wafra. To do this, he set up a solar panel and connected the panel to batteries, which in turn, power the irrigation system that waters his crops. “The device comes at a low cost and [can be used] in beach facilities, parks, and recreational areas, as well as walking and exercise paths across the country” (Toumi). By using solar panels and irrigation systems such as this, Kuwait could use less water and money for agricultural purposes in future years. That money and water could be put towards expanding the agriculture industry in Kuwait. This method of water and electricity-saving technology could be combined with hydroponics to ensure the greatest amount of efficiency in growing crops in Kuwait. Between the money saved from more water-efficient farming practices, and oil drilling all over the country, Kuwait has a chance to maintain its status as a wealthy country and possibly even produce enough food to feed its own people. Growing food locally will keep money circulating in the country, rather than going across the borders to pay for imported goods. This country in the middle of the desert has a chance to become agriculturally stable once again, but in a new way through the use of modern, alternative farming practices. Once considered to be in one of the most fertile areas of the world, this land has been transformed into desert as a direct result of poor farming practices. Through hard work the Kuwaiti people and education about alternative farming techniques, water conservation practices, and their environment, Kuwait will one day be able to support its own food and water needs again.

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